equally spaced in wavelength space.

a1 cancel

5. (AMENDED) An optical spectrum analyser according to claim 2 in which the peak wavelengths of the gratings are tuneable over different wavelength ranges, the ranges being of substantially the same spectral width.

a2

9. (AMENDED) An optical spectrum analyser according to claim 1 in which the full width half maximum spectral bandwidth of the or each grating is between 0.05 nanometers and 0.5 nanometers.

10. (AMENDED) An optical spectrum analyser according to claim 1 in which the side-lobe suppression ratio of the or each grating is greater than -20dB.

11. (AMENDED) An optical spectrum analyser according to claim 1 in which the axial force is strain.

a3

13. (AMENDED) An optical spectrum analyser according to claim 2 in which an optical signal selected by the tuneable optical filter is reflected by only one grating.

a4

17. (AMENDED) An optical spectrum analyser according to claim 2 in which the first and second sections of fibre are located within a grating length of optical fibre, the grating length of fibre being long compared to the lengths of said sections.

a5

20. (AMENDED) An optical spectrum analyser according to claim 4 in which the difference in the peak wavelengths of the gratings is equal to the wavelength spacing of the optical channels multiplied by a numerical factor.

a6

22. (AMENDED) An optical spectrum analyser according to claim 17 wherein said means operable to apply a variable axial force applies a strain and wherein the grating length of optical fibre is mounted on the means operable to apply a variable strain, to thereby enable a variable

strain to be applied to the first and second sections of fibre, and hence to both gratings, at the same time.

a6 cancel

23. (AMENDED) An optical spectrum analyser according to claim 15 in which the optical detection means is communicatively connected to the second leg on the one side of the first coupler.

a7

32. (AMENDED) An optical spectrum analyser according to claim 28 in which the optical spectrum analyser further includes means operable to compare the output signals of the first and second photodetectors, to thereby determine the wavelength of the optical signal reflected from one of the gratings.

a8

34. (AMENDED) An optical spectrum analyser according to claim 15 in which the first and second sections of fibre are provided in physically separate first and second grating lengths of optical fibre, the grating lengths of fibre being physically long compared to the said sections.

a9

37. (AMENDED) An optical spectrum analyser according to claim 34 in which each of the grating lengths of fibre is mounted on a separate means operable to apply a variable strain to a respective one of the first and second sections of fibre, the said means being operable to enable a variable strain to be applied to each of the first and second sections of fibre at either the same time or at different times.

a10

39. (AMENDED) An optical spectrum analyser according to claim 2 in which the tuneable optical filter includes more than two in-fibre Bragg gratings, each grating being inscribed in a respective section of fibre.

40. (AMENDED) An optical spectrum analyser according to claim 25 in which the optical spectrum analyser further comprises means operable to reduce the signal to noise ratio in the output signal of a or each photodetector, the said means comprising phase-lock loop apparatus connected to the respective means for applying a variable force and the said photodetector.

a10 cancel

41. (AMENDED) An optical spectrum analyser according to claim 11 in which the means operable to apply a variable strain comprises a spaced pair of mandrels, the part of the grating length of fibre including the section or sections of fibre including one or more gratings being mountable therebetween.

a11

43. (AMENDED) An optical spectrum analyser according to claim 41 in which the mandrels are fabricated from a material which minimises the forces acting between the mandrel and the fibre coating without abrading or chemically altering the fibre coating, such as a self-lubricating material, such as graphite.

44. (AMENDED) An optical spectrum analyser according to claim 41 in which a continuous groove is provided around the outer surface of each mandrel, for receiving the parts of the grating length of fibre on either side of the section or sections of fibre including one or more gratings, the groove extending for a plurality of turns around the mandrel, to enable the said lengths of fibre to complete a sufficient number of turns around the mandrel to be held in place on the mandrel by means of frictional forces.

45. (AMENDED) An optical spectrum analyser according to claim 41 in which the mandrels are movably mounted on a mounting member, one mandrel being rotatably mounted on the mounting member on a motor means operable to rotate the said mandrel.

46. (AMENDED) An optical spectrum analyser according to claim 41 in which the means operable to apply a variable strain further comprises a elongate member, in the form of a metal beam, mounted on one end of the other mandrel and extending to a stop member provided on the mounting member, rotation of the one mandrel exerting a pulling force on the fibre mounted between the mandrels, thereby causing rotation of the other mandrel until the elongate member abuts the stop member, further rotation of the other mandrel thereby being prevented, such that a further rotation of the one mandrel causes strain to be applied to the said fibre and the elongate member.

a11 conceal

47. (AMENDED) An optical spectrum analyser according to claim 11 in which the means operable to apply a variable strain is athermalised.

48. (AMENDED) An optical spectrum analyser according to claim 46 in which an electrical strain gauge is provided on the elongate member, the strain gauge being operable to measure the strain applied to the elongate member, to thereby enable the amount of strain applied to the section or sections of fibre including one or more gratings and hence the wavelength of the or each grating in the tuneable optical filter to be inferred.

49. (AMENDED) An optical spectrum analyser according to claim 2 in which the optical spectrum analyser further comprises optical calibration apparatus for calibrating the peak wavelength of the or each grating in the tuneable optical filter.

a12

54. (AMENDED) An optical spectrum analyser according to claim 53 in which the or each reference grating is athermalised, or the peak wavelength of the or each reference grating is known at a specified temperature, from independent calibration.

55. (AMENDED) An optical spectrum analyser according to claim 52 in which the optical source is a light emitting diode, the optical output spectrum of the light emitting diode including the peak wavelength of the or each reference grating.

56. (AMENDED) An optical spectrum analyser according to claim 50 in which the optical calibration apparatus is connectable to the optical spectrum analyser between the input length of fibre and the tuneable optical filter, to thereby provide an alternative input signal to the optical spectrum analyser, the second leg on one side of the calibration coupler being communicatively connectable to the input length of fibre and the second leg on the second side of the calibration coupler being communicatively connectable to the one leg on one side of the first coupler.

a13

61. (AMENDED) An optical spectrum analyser according to claim 59 in which the

a13 reflectivity of the or each reference grating varies as a function of wavelength across its spectral bandwidth, such that the intensity of an optical signal reflected by a reference grating is dependent on the wavelength of the optical signal.

a14 67. (AMENDED) An optical spectrum analyser according to claim 59 in which the or each reference grating is athermalised.

68. (AMENDED) An optical spectrum analyser according to claim 57 in which the optical calibration apparatus is connectable to the optical spectrum analyser in place of the or a photodetector within the optical detection means, the first photodetector detecting a part of an optical input signal reflected by the tuneable optical filter and the second photodetector detecting the said part of the input signal reflected by the tuneable optical filter and the reference grating.

a15 74. (AMENDED) An optical spectrum analyser according to claim 71 in which the peak wavelength of the second grating is within the 1290 nanometers to 1310 nanometers wavelength range.

75. (AMENDED) An optical spectrum analyser according to claim 70 in which the optical source is a broadband light emitting diode, the optical spectrum of the light emitting diode including the peak wavelength of the second grating.

76. (AMENDED) An optical spectrum analyser according to claim 70 in which the photodetector is operable to detect an optical signal reflected by the second grating.

77. (AMENDED) An optical spectrum analyser according to claim 70 in which the optical spectrum of the reference grating includes a plurality of passbands, such that only wavelengths of light which correspond to the wavelengths of the passbands are transmitted to the photodetector.

78. (AMENDED) An optical spectrum analyser according to claim 70 in which the reference grating is athermalised, or the wavelength offset due to temperature effects is deduced from the

a15 cancel temperature experienced by the reference grating, the exact wavelength of the reference grating thereby being determinable.

79. (AMENDED) An optical spectrum analyser according to claim 70 in which the reference grating comprises a sampled grating.

80. (AMENDED) An optical spectrum analyser according to claim 70 in which the reference grating comprises a moire grating.

81. (AMENDED) An optical spectrum analyser according to claim 70 in which the reference grating comprises a chirped Bragg grating.

82. (AMENDED) An optical spectrum analyser according to claim 25 in which one or more of said optical fibre couplers is a 50: 50 2x2 optical fibre coupler.

a16 85. (AMENDED) An optical spectrum analyser according to claim 1 in which the axial force is compression.

86. (AMENDED) An optical spectrum analyser according to claim 2 in which the optical signal selected by the tuneable optical filter is transmitted by one grating.

REMARKS

This preliminary amendment is presented prior to examination of the above-identified application filed pursuant to 35 USC §371 based on PCT/GB00/00496. No new matter is believed added by these claim amendments which are presented purely for clarity purposes only; no limiting of the claimed subject matter is to be inferred from the amendments.